50 Nicotine polacrilex gum and sustained attention

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The effects of nicotine polacrilex gum upon sustained attention were investigated in three studies. Each study was double-blind and placebo controlled, with drugs administered in a counterbalanced order. The subject groups comprised 16 smokers, different in each study, who had abstained from smoking for 12 hours prior to testing. Sustained attention was assessed using the Wesnes and Warburton rapid visual information processing (RVIP) task.
In the first study, nicotine increased the number of target detections in a significant dose related manner ($p<.01$), with the greatest performance improvement under cigarette smoking (+2.2 targets), a smaller improvement under 4 mg gum (+1.9 targets), almost unchanged performance with 2 mg gum (+0.2 targets), and a comparative performance decrement under placebo (-2.2 targets). Response times showed a significant curvilinear function ($p<.01$), with improved times under 2 mg gum and 4 mg gum, while times under placebo and cigarette were close to baseline.
In the second study, the effects of nicotine were investigated upon a battery of 4 attention tasks: RVIP (as above), letter cancellation, Stroop, and a width of attention task. The RVIP task findings were similar to those found in study 1, with improved target detection under the nicotine conditions, and performance decrements under placebo. The main difference from study 1 was that target detections were improved to the greatest extent under 2 mg gum. RVIP response times again showed a curvilinear function, almost identical to that shown in the previous study. These findings, have implications for the Yerkes-Dodson inverted-U function hypothesised to underly the arousal-performance relationship. Slight differences in experimental design, leading to different durations of nicotine ingestion (necessitated by the longer test sessions in study two), may have contributed to the subtle RVIP performance differences between studies 1 and 2. Width of attention was not affected by nicotine, nor was Stroop task performance, but letter cancellation times were significantly faster under smoking. Overall, nicotine therefore improved sustained attention or 'vigilance', but did not affect the width of attention or attentional selectivity.
The third study compared 8 regular smokers (+15 cigarettes/day), with 8 non-regular smokers (-5 cigarettes/day), to investigate whether the degree of nicotine deprivation affected response to 4 mg nicotine gum. Regular smokers reported significantly higher ratings of nicotine 'craving' before testing ($p<.05$). RVIP target detections in the regular smokers increased under nicotine gum (+3.3 targets), but decreased under placebo gum (-1.1 targets), while in the non-regular smokers, target detection rates were similar under nicotine and placebo. Although the ANOVA group x drug interaction effect was not statistically significant ($P=0.13$, two-tail), the above finding is broadly in agreement with previous research which suggests that nicotine only improves performance in nicotine deprived subjects. Thus non-regular smokers, not being in a state of acute nicotine deprivation, showed little performance change following the nicotine gum.

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